PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

IN THE APPLICATION OF:

YVES TERMONIA ET AL.

CASE NO.: CL2120 USNA APPLICATION NO.: 10/719,813

CONFIRMATION NO.: 3356 GROUP ART UNIT: 1771

EXAMINER: ANDREW T. PIZIALI FILED: NOVEMBER 21, 2003

FOR: HIGH STRETCH RECOVERY NON-WOVEN FABRIC AND PROCESS FOR PREPARING

RESPONSE TO NON-COMPLIANT APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attention: Mail Stop Appeal Brief - Patents

Sir:

This is in response to the Non-Compliant Appeal Brief dated May 17, 2007. An amended Appeal Brief is attached.

No fee is believed to be due with this submission. However, if any fee is due, please charge Deposit Account No. 50-3223.

Date: 6/18/07

Respectfully submitted,

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APPEAL BRIEF PURSUANT TO 37 C.F.R. §41.37

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attention: Mail Stop Appeal Brief - Patents

Sir:

This is an appeal to the Board of Appeals from a Final Office Action mailed October 13, 2006 and a subsequent Advisory Action mailed January 8, 2007, in which the Examiner finally rejected claims 1-3, 6-8, 10 and 11 of the above-identified application. Appellants timely filed a Notice of Appeal on January 10, 2007 via facsimile. Therefore, the due date for filing the Appeal Brief is April 10, 2007, with the accompanying Petition for a One-Month Extension of Time. This brief is being filed in support of that Notice of Appeal.

As required by 37 C.F.R. §41.37, a single copy of this brief is being filed with the filing fee of $500.00. Please charge the fee to Deposit Account No. 50-3223.

1. REAL PARTY IN INTEREST

The real party in interest in the present appeal is Invista North America S.à r.l., a *société à responsabilité limitée*, incorporated under the laws of Luxembourg, having acquired rights from E.I. DuPont De Nemours and Company by way of an assignment recorded in the United States Patent and Trademark Office at Reel 015286, Frame 0708, having acquired rights from the inventors by way of an assignment recorded in the United States Patent and Trademark Office at Reel 014361, Frame 0469.

2. RELATED APPEALS AND INTERFERENCES

No related appeals or interferences are known to the Appellants or to Appellants' legal representative which will directly affect or be directly affected by or have bearing on the Board's decision in this appeal.

3. STATUS OF THE CLAIMS

Claims 1-20 are currently pending in the application. Claims 4, 5, 9, and 12-20 have been withdrawn. Claims 1-3, 6-8, 10 and 11 stand finally rejected. The rejections of claims 1-3, 6-8, 10 and 11 are being appealed.

4. STATUS OF AMENDMENTS

No amendments have been made to the claims subsequent to the final rejection.

5. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention provides a non-woven fabric including bicomponent fibers oriented in a well-defined plane, where the fabric has a bulk density of 0.2-0.4 g/cm^3. This fabric has the advantages of a higher toughness and higher stretch recovery that have not been previously realized in the art. The two independent claims currently pending are 1 and 11. Since these claims have not been amended subsequent to the filing of the application, Appellants submit that these claims are self supporting.

Additionally, support for claim 1 is found in the specification at p. 2, line 34 to p. 3, line 6; and support for claim 11 is found at p. 2, line 34 to p. 3, line 6; with the staple fiber length supported at page 6, line 13; the polyethylene terephthalate and polypropylene terephthalate ratio supported at page 5, line 36; and the Young's Modulus and ultimate stretch supported at page 8, line 27.

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The issue on appeal is:

I. Are claims 1-3, 6-8, 10 and 11 obvious under 35 U.S.C. §103(a) over Japanese patent 11-158733 to Aranaga et al. ("Aranaga") in view of U.S. Patent No. 4,038,452 to Kobayashi et al. ("Kobayashi")?

7. ARGUMENTS

I. Claims 1-3, 6-8, 10 and 11 are not obvious over Aranaga in view of Kobayashi.

Claims 1-3, 6-8, and 10-11 have been rejected under 35 U.S.C. §103(a) as unpatentable over Japanese patent 11-158733 to Aranaga et al. ("Aranaga") in view of U.S. Patent No. 4,038,452 to Kobayashi et al. ("Kobayashi.") These rejections are respectfully traversed on the grounds that the Examiner has failed to establish a *prima facie* case of obviousness.

According to M.P.E.P. §2143, "To establish a *prima facie* case of obviousness, three basic criteria must be met." There must be a suggestion or motivation to combine the references, a reasonable expectation of success, and the references must teach every element of the claims. Appellants respectfully submit that each of these elements is deficient as set forth below.

Claim Elements

The combination of Aranaga with Kobayashi fails to teach or suggest every element of the present claims. Specifically, neither Aranaga nor Kobayashi discloses, teaches or suggests (1) a polyester bicomponent fabric having a bulk density of 0.2-0.4g/cm^3 or (2) a fabric wherein the fibers are oriented in a well-defined plane.

The Examiner has cited Kobayashi for the purposes of providing the bulk density of the fabric. Kobayashi discloses a non-woven fabric including 50-95% by weight of spontaneously crimped acrylonitrile polymer fibers. The fabric is disclosed as having an apparent density of 0.05 to 0.25g/cm^3. Out of context, it would appear that this density overlaps with the density range of the present invention from 0.20 to 0.25g/cm^3, however, density is not an appropriate parameter for direct comparison between fabrics having fibers

of different polymer compositions. There are some characteristics of fibers which are directly comparable such as fiber length, which are not dependent on the molecular weight of the polymer from which the fiber is prepared. However, density is a characteristic of a fiber which depends, in part, on the composition of the polymer itself. Acrylonitrile, polyethylene terephthalate and polytrimethylene terephthalate all have different molecular weights, and therefore different polymer densities. Therefore, it cannot be assumed that the density of a fabric including acrylonitrile fibers is comparable to the density of a fabric including polyester bicomponent.

The Examiner has responded to Appellants' assertion that the apparent density of Kobayashi cannot be directly compared to that of the present invention by stating that it would have been obvious to look to Kobayashi to show "conventional nonwoven fabric bulk density." However, Appellants maintain that since the bulk density of the fabric is a property depending on the density of the polymer, the density of a polyester fabric cannot be directly compared to the density of an acrylonitrile containing fabric. Furthermore, given the significantly different densities of these polymers, one of skill would not look to teachings of acrylonitrile fabrics to prepare polyester fabrics.

The Examiner asserts at page 5, third paragraph of the action dated October 13, 2006 that, "the density referred to by Kobayashi...is the density of the fabric, not the density of the fibers of the fabric." However, the Examiner has ignored the fact it is the polymer alone that gives the fabric its density and that the fabric and the polymer contained therein, are not mutually exclusive. The density of two different polymer containing fabrics are no more interchangeable than the densities of the polymers themselves, since it is the density of the polymer that primarily provides the density of the fabric. The reason is that a fabric arguably contains only two components, polymer fiber and air. Since the density of air is negligible in comparison, the density of the fabric is determined by density of the polymer fiber.

For example, given an equal volume of two different substances having different densities, the substance with the higher density will be heavier (i.e., have more mass). Therefore, in order to achieve a fabric of the same density for a given volume, one would need to add a larger amount (a greater volume) of the substance having the smaller density in comparison to the substance having the greater density to achieve two separate fabrics having the same bulk density. In other words, the polyester fabric has more space and less polymer than an acrylonitrile fabric having the same bulk density because the density of

polyester is significantly greater than the density of acrylonitrile. This point is emphasized below:

Density (ρ) is obtained by the following formula (I):

(I) $\rho = m/V$, where m is mass and V is volume, therefore:

(II) $\rho_{fabric} = m_{fabric}/V_{fabric}$, and

(III) $m_{fabric} = m_{polymer} + m_{air}$.

However, since the mass of air is negligible, we assume that:

(IV) $m_{fabric} = m_{polymer}$,

and since $m = \rho V$, from (I) we substitute for the mass in (IV) to obtain

(V) $\rho_{fabric}V_{fabric} = \rho_{polymer}V_{polymer}$

The ratio of the volume of polymer compared to the volume of fabric is:

$V_{polymer} = \rho_{fabric}V_{fabric}/\rho_{polymer}$ or $V_{polymer} = (\rho_{fabric}/\rho_{polymer})V_{fabric}$

For the lower limit of the bulk density range of claim 1:

$V_{polymer} = (0.2/\rho_{polymer})V_{fabric}$.

For the polyester of the present invention ρ is approximately 1.38g/cm^3, while for the acrylonitrile of Kobayashi ρ is approximately 0.81g/cm^3, which is nearly half the density of polyester. Therefore, in order to achieve a fabric bulk density of 0.2g/cm^3, the volume of polyester would be about 15% of the fabric volume while acrylonitrile would be about 25% of the fabric volume. Given the significant difference in the volume of polymer required to prepare the different fabrics, it is clear that a teaching of an acrylonitrile fabric is not applicable to teaching a polyester fabric.

Kobayashi also fails to disclose teach or suggest a fabric wherein the fibers are oriented in a well-defined plane. Kobayashi discloses a bulky non-woven fabric which includes a fibrous web wherein, "simultaneously with crimp development, the web is shrunk in the surface area and increases in thickness." (Column 7, lines 56-59). Kobayashi provides no control to the thickness of the fabric and teaches that no outer mechanical force should be applied that would limit the increase in thickness of the fabric. This method is contrary to the development of a fabric with fibers oriented in a "well-defined plane" as required by the present invention. This is achieved through the use of two constraining surfaces which limit the thickness of the fabric. (Paragraph [0012]). The production of a well-defined plane is essential to provide the higher density resulting in higher toughness and higher stretch recovery of the fabrics of the present invention (Paragraph [0021]).

Since Kobayashi fails to disclose, teach, or suggest either a density of a non-woven polyester bicomponent fabric in the range of 0.20 to 0.40 g/cm^3 or a non-woven fabric in the configuration of a well-defined plane, the combination of Aranaga and Kobayashi fails to provide a *prima facie* case of obviousness.

Motivation to Combine

The motivation to combine references or modify a reference must be found in the prior art, however, no such motivation is present in either Aranaga or Kobayashi. The Examiner states at page 3, line 11 of the Office Action dated October 14, 2005 ("the Office Action"), that one having ordinary skill in the art would combine the teachings of Aranaga with Kobayashi, "motivated by the expectation of successfully practicing the invention of Aranaga." The Examiner seems to be stating that there is some deficiency in the teachings of Aranaga. However, the only deficiency that the Examiner points out is the deficiency of Aranaga to disclose the elements of the present claims. Specifically, the Examiner states that Aranaga does not disclose "the orientation of the fibers, the number of crimps per inch, the crimp radius of curvature, and the bulk density of the non-woven fabric." (page 2 of the Office Action). The Examiner has used these limitations of the present claims as a template to be filled with the teachings of Kobayashi. This use of the present claims as a template is tantamount to impermissible hindsight reconstruction.

Expectation of Success

The limitations of the present claims, particularly the bulk density of the fabric have resulted in a fabric having an increased toughness and stretch recovery compared to previous fabrics derived from bicomponent fibers. Aranaga recognizes the potential of the bicomponent fibers to provide a high value non-woven; however, Aranaga also recognizes that fibers having high retractive force tend to crimp independently resulting in an increase in fabric bulkiness at the expense of a decrease in entanglement formation. Kobayashi provides no method through which the bulk density of the fabric may be increased. Therefore, even where the teachings of Aranaga and Kobayashi are combined, no method is provided for the preparation of a polyester bicomponent fabric having an increased bulk density.

Furthermore, Kobayashi specifically teaches away from the method of preparing a non-woven fabric provided by the present invention. The present invention achieves an increased bulk density of the fabric by providing constraining surfaces, an outer mechanical

force, to the fabric. The goal of Kobayashi is to allow the fabric to increase in thickness and specifically states that no outer mechanical force should be applied. (Column 7, lines 57-59.) In effect, Kobayashi teaches away from the present invention. Although the fabric of Kobayashi includes "uniformity in the surface density and flatness" as pointed out by the Examiner at page 6, lines 2-3 of the final office action, this is clearly not the result of an external mechanical force which is required in the present invention to achieve the claimed fabrics.

CONCLUSION

The combination of Aranaga and Kobayashi fails to teach a polyester bicomponent fabric in a well-defined plane having a density of 0.2-0.4g/cm^3. Considering that the references are directed to different polymer fibers (polyester versus acrylonitrile), one of skill in the art would have neither the motivation to combine the references nor an expectation of success. Therefore, Appellants respectfully submit that the combination of Aranaga and Kobayashi fails to provide a *prima facie* case of obviousness.

In view of the remarks set forth above, reconsideration and withdrawal of the rejections are appropriate and respectfully requested. Appellants submit that the present claims are patentably distinct over the art and in allowable form. Early allowance is, therefore, solicited. If the Examiner has any questions regarding this Appeal Brief, the Examiner is invited to contact the undersigned attorney.

Date: 10/18/07

Respectfully submitted,

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8. CLAIMS APPENDIX

1. (original) A non-woven fabric comprising a plurality of entangled helically crimped asymmetric bicomponent fibers comprising a first crystallizable polyester component and a second crystallizable polyester component, said first crystallizable polyester component exhibiting a lower rate of crystallization than said second crystallizable polyester component, said fibers being characterized by a denier range of 0.5 to 6 denier, said fibers exhibiting at least 50 crimps per inch with a crimp radius of curvature of 0.2 mm or less, and wherein said fibers are preponderantly entangled with one another, and wherein further said fibers are preponderantly oriented in a well-defined plane said non-woven fabric being characterized by a bulk density of 0.2-0.4 g/cm^3.

2. (original) The non-woven fabric of Claim 1 wherein the bicomponent fibers are side-by-side bicomponent fibers.

3. (original) The non-woven fabric of Claim 1 wherein said first crystallizable polyester component is poly(ethylene terephthalate) and said second crystallizable polyester component is poly (propylene terephthalate).

4. (withdrawn) The non-woven fabric of Claim 1 wherein said first crystallizable polyester component is poly(propylene terephthalate) and said second crystallizable polyester component is poly (butylene terephthalate).

5. (withdrawn) The non-woven fabric of Claim 1 wherein said first crystallizable polyester component is poly(ethylene terephthalate) and said second crystallizable polyester component is poly (butylene terephthalate).

6. (original) The non-woven fabric of Claim 1 wherein said bicomponent fibers are predominantly staple fibers.

7. (original) The non-woven fabric of Claim 6 wherein said first crystallizable polyester is poly (ethylene terephthalate) and said second crystallizable polyester is poly (propylene terephthalate) at a concentration ratio in the range of 70:30 to 30:70 respectively.

8. (original) The non-woven fabric of Claim 7 wherein the concentration ratio is in the range of 60:40 to 40:60 respectively.

9. (withdrawn) The non-woven fabric of Claim 1 wherein said bicomponent fibers are continuous.

10. (original) The non-woven fabric of Claim 1 further characterized by an initial Young's modulus of 1.2 to 12 MPa and ultimate stretch of up to 150%.

11. (original) A non-woven fabric comprising a plurality of entangled helically crimped side-by side staple bicomponent fibers in the range of 0.5 to 6 denier and an uncrimped length in the range of 20 to 25 millimeters comprising polyethylene terephthalate and polypropylene terephthalate at a concentration ratio in the range 60:40 to 40:60, said fibers exhibiting at least 50 crimps per inch with a crimp radius of curvature of 0.2 mm or less, and wherein said fibers are preponderantly entangled with one another, and wherein further said fibers are preponderantly oriented in a well-defined plane said non-woven fabric being characterized by a bulk density of 0.2-0.4 g/cm^3, an initial Young's modulus of 1.2 to 12 MPa, and ultimate stretch of up to 150%.

12. (withdrawn) A process for forming a non-woven fabric, the process comprising disposing a plurality of asymmetric bicomponent fibers having latent crimp in a planar array of overlapping fibers, said fibers being preponderantly oriented in the plane thereof, disposing said planar array between two constraining surfaces; heating said planar array to develop at least a portion of said latent crimp with the proviso that during at least a portion of said heating, said non-woven structure is in constraining contact with said constraining surfaces.

13. (withdrawn) The process of Claim 12 wherein said planar array is in the form of a fibrous mat preform.

14. (withdrawn) The process of Claim 12 wherein the bicomponent fibers are side-by-side bicomponent fibers.

15. (withdrawn) The process of Claim 12 wherein the bicomponent fibers consist essentially of polyesters.

16. (withdrawn) The process of Claim 12 wherein said first crystallizable polyester component is poly(ethylene terephthalate) and said second crystallizable polyester component is poly (propylene terephthalate).

17. (withdrawn) The process of Claim 12 wherein said first crystallizable polyester component is poly(propylene terephthalate) and said second crystallizable polyester component is poly (butylene terephthalate).

18. (withdrawn) The process of Claim 12 wherein said first crystallizable polyester component is poly(ethylene terephthalate) and said second crystallizable polyester component is poly (butylene terephthalate).

19. (withdrawn) The process of Claim 12 further comprising the step of forming the fibrous mat preform from an aqueous slurry of floc having an average length of 3 to 25 millimeters.

20. (withdrawn) A process for forming a non-woven fabric, the process comprising forming a fibrous mat preform from an aqueous slurry of side by side uncrimped staple bicomponent fibers having a latent crimp contraction of at 70-80%, 20-25 millimeters in length, disposing said fibrous mat preform between two constraining surfaces; heating said planar array to develop at least a portion of said latent crimp with the proviso that during at least a portion of said heating, said fibrous mat preform is in constraining contact with said constraining surfaces; said bicomponent fibers comprising polyethylene terephthalate and polypropylene terephthalate in a respective concentration ratio in the range of 60:40 to 40:60.

9. EVIDENCE APPENDIX

No additional evidence was submitted in this application including evidence pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132.

10. RELATED PROCEEDINGS APPENDIX

No related appeals or interferences are known to Appellants or Appellants' legal representative which will directly affect or be directly affected by or have bearing on the Board's decision in this appeal.